

This very distinct species, because of the peculiarities of its thorax, should be confused with no other species in our fauna. In my table, it should follow *C. hubbardi* Schwarz, the two in their turn to follow *C. concinnus* Boh. It is, however, not closely related to either.

*C. bohemanni* Horn. This should be placed as a synonym of *C. platalea* Say. As stated by Dr. E. A. Schwarz, Bohemann used the term "pone" for "near" and not "behind" as interpreted by Dr. Horn.

*C. quadricollis* Van Dyke. Two specimens from the Nat. Mus., collected at Republic, Oregon, by Mr. A. W. Barber, have been seen. This shows the northward distribution of the species, as was to be expected.

*C. ellipticollis* Van Dyke. Six specimens from Arizona, mostly Winslow, belonging to the Nat. Mus., have been seen.

*C. concinnus* Boh. This should be reduced to a variety of *C. impressifrons* Boh. A review of the literature has convinced me that there is no valid reason for retaining it apart.

*C. crenatus* Horn. Specimens of this species have been taken in abundance in various parts of California, from the so-called digger pine, *Pinus sabiniana* Dougl.

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## NOTES ON STRATEGUS MORMON.

BY WARREN KNAUS, McPherson, Kan.

The writer first took this rare Scarabæid June, 1913, on ground he had collected over at least once a season for almost a quarter of a century. The two specimens were male and female from burrows under horse droppings. The burrows are easily distinguishable, being about  $1\frac{3}{4}$  inches in diameter, larger by a fourth than the similar holes of *Phanæus difformis* in the same situation. Usually a pile of freshly turned sand at horse droppings indicates a burrow, the larger *Strategus mormon*, the smaller the *Phanæus*; but occasionally there is no sand heap or covering around the larger. The hole either goes straight down or inclines not over fifteen degrees and varies from four to twelve inches in depth. My first two *Strategus* was taken on a perfectly bare sand dune, probably fifty yards apart.

In 1915 I secured eight specimens on the dunes under horse droppings a mile away from the locality of my first specimens. They were five males and three females, coming from late in

May to early July. At one pile of droppings the fresh sand had been thrown up and a lateral burrow extended west from the pile for about fifteen inches. By running my finger under the ridge I encountered a male, which apparently had come upward from association with the female and, reaching the horse droppings, was tunneling out. The female was in the burrow about ten inches below the surface. About ten feet away another male was taken from his burrow. Still another was found about two hundred yards away from the first, at the bottom of an eight inch hole, the entrance of which was at least six inches away from the droppings.

June 16, 1916, a visit to the same locality (near Medora, Kansas) resulted in the capture of another pair on the same dune where I took my first specimens. One was located under horse droppings evidently three or four weeks old, almost covered by drifting sand. This was a male. Between four and six inches under the surface there was a mass of dung  $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches in diameter and several inches long. In it were found seven eggs, two to three mm. in diameter, almost pearly white. Twenty feet away another pile, partly sand covered, revealed another burrow. In this at the bottom, about ten inches down, was a female. Six inches under the surface there was a similar mass of dung. It is evident that the species prefers droppings from one to three weeks old, while fresher ones are chosen by *Phanæus difformis*. Thus the masses for egg deposit are much drier and less compact for the former than the latter. *Phanæus* will also use cow droppings, under which I have never found *Strategus*. All the specimens I have taken were alive and perfect.

By the fortunate finding of two additional specimens of *Strategus mormon* in the sand hill region near Medora, Kansas, July 2, the total catch of this insect for 1916 was increased to four specimens—two pairs.

The first specimen was found about three miles east of the locality where the other specimens of this species have been collected. The specimen was a female, and was found dead under cattle chips. The insect had only recently died, as it was relaxed and in good condition. Under the droppings was the mass of fæces in which the female deposits her eggs. The fragments of

another *Strategus* was also found a half mile west. The other specimen taken was found in the locality where all the specimens heretofore have been taken. It was a male and was dead under a pile of horse droppings. It too had only recently died, as it was relaxed and in fine condition.

The findings of these two specimens dead indicated that the season was over and this was further shown by the fact that no other specimen was found nor any of their characteristic holes in the sand observed.

It is interesting to note the sequence of insect life as represented by the Coleoptera in this sand hill region. I collected on four dates of the ordinary spring collecting season, the result showing partially as follows: May 7, 19 *Cicindela scutellaris*, 15 *C. formosa*, 9 *C. tranquebarica*, 12 *C. repanda*, 1 *C. hirticollis*, 1 *Geopinus fluvialis*, Casey, 1 *Chlaenius pennsylvanicus*, 1 *Selenophorus* sp., 5 *Sphaeridium scarabeoides*, 1 *Saprinus* sp., 1 *Canthon praticola*, 1 *Phaneus difformis*, 3 *Onthophagus guatemaliensis*, 3 *Geotrupes opacus*, 8 *Ligyris relictus*, 1 *Cremastochilus nitens*.

On June 16 these were taken: 25 *C. formosa*, 6 *C. scutellaris*, 1 *C. lengii*, 3 *C. repanda*, 11 *Phaeneus difformis*, 3 *Tetraopes canescens*, 1 *Sphenophorus destructor*.

On June 25 these Cicindelidæ were taken: 6 *C. formosa*, 1 *C. tranquebarica*, 6 *C. cuprascens*, 4 *macra*, 31 *C. hirticollis*, including several of the variety *ponderosa*, and 73 *C. lepida*. Of the 73 *C. lepida*, 3 had green thorax and head. All the rest were bronzed.

On July 2 the following were taken: 28 *Cicindela lepida*, including one with a green head and thorax; 11 *Phaeneus difformis* of which most of the males had fully developed horns. This was also characteristic of the males of this species taken June 16.

*Cicindela lepida* occurred on perfectly bare white sand, back a considerable distance from the pools of water. *Cicindela hirticollis*, *cuprascens* and *macra* occurred along the water's edge and back fifteen or twenty feet. The *lepida* were good runners, but were not strong fliers and a collector could stand at one place and take a half dozen or more by successive sweeps of the net. They preferred the sheltered sides of sand dunes and appeared usually about nine o'clock in the morning, becoming more active as the sand became heated.